

ADVANCED DATABASES

V Semester: IT								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AIT505	Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil			Total Classes: 45	
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> I. Define entity relationship model and transaction processing system. II. Understand various storage structures for database. III. Describe the distributed and parallel database processing. IV. Describe object oriented database concepts and models. V. Understand various advancements in database technology. <p>COURSE OUTCOMES (COs):</p> <p>CO 1: Understand the concept of Active Databases in Starburst, Oracle, and DB2. CO 2: Analyze the concepts of Temporal and Object Databases-SQL. CO 3: Understand the Concepts of Relational calculi, relational algebra and recursion. CO 4: Explore the concept of Spatial, Text and Multimedia Databases. CO 5: Understand the concept of Uncertainty in Databases.</p> <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Understand and explain the key ideas underlying database systems and the database approach to information storage and manipulation. 2. Design and implement database applications. 3. Understand the types of tasks involved in database administration and the facilities provided in a typical database system to support these tasks. 4. Design adequate backup, recovery and security measures for a database installation, and understand the facilities provided by typical database systems to support these tasks. 5. Define and use important temporal concepts, such as time point, time interval, and time-interval operators such as before, after and overlaps. 6. Understand the temporal data model at the conceptual level. 7. Describe some of the extensions to conventional query languages that have been proposed to support temporal query processing. 8. Critically assess the strengths and weaknesses of Object databases with respect to Relational systems. 9. Describe why Object databases appear to be such a good fit for a number of major growth areas in computing, such as Web-based and multimedia information systems. 10. Describe the strategy being adopted by major database supplier Oracle to address the apparent threat of Object database systems, and critically compare this approach with a pure Object technology approach 11. Formulate, using relational calculus solutions to a broad range of query problems 12. Identify a range of concepts, techniques and tools for creating and editing the interactive multimedia database 13. Identify the current and future issues related to multimedia technology to store information 14. Impart an overview of emerging data models like temporal, mobile and spatial databases 15. Understand the commercial relational database system (Oracle) by writing SQL using the system. 								

UNIT -I	ACTIVE DATABASES:	Classes: 10
Syntax and Semantics (Starburst, Oracle, DB2): Taxonomy, applications, integrity management, workflow management, business rules, design principles, properties, rule modularization, rule debugging, IDEA methodology, open problems.		
UNIT -II	TEMPORIAL AND OBJECT DATABASES:	Classes: 10
Overview: Time domain, data types, associating facts with time, temporal query language; Transact-SQL (T-SQL): Time ontology, data model, language constructs; Implementation: System architecture, temporal support, support for TSQL2.		
UNIT -III	COMPLEX QUERIES AND REASONING:	Classes: 09
Logic of Query Languages: Relational calculi, relational algebra, recursive rules, syntax and semantics of data log, fix point semantics. Implementation Rules and Recursion: Rule rewriting methods, compilation and optimization, recursive queries in SQL, open issues.		
UNIT -IV	SPATIAL, TEXT AND MULTIMEDIA DATABASES:	Classes: 08
Traditional Indexing Methods: Secondary keys, spatial access methods, text retrieval; Multimedia indexing: 1D time series, 2D color images, sub pattern matching		
UNIT -V	UNCERTAINTY IN DATABASES AND KNOWLEDGE BASES:	Classes: 08
Introduction: Uncertainty in image database, uncertainty in temporal database, uncertainty in null value; Models of uncertainty; Uncertainty in relational databases: Lattice based relational databases, probabilistic relational databases.		
Text Books:		
1. Carlo Zaniolo, Stefano Ceri, "Advanced Database Systems", Morgan Kauffmann Publishers, VLDB Journal, 1 st Edition, 1997		
Reference Books:		
1. Raghu Ramakrishnan, "Database Management System", McGraw-Hill Publications, 3 rd Edition, 2000. 2. Abraham Silberschatz, Henry F. Korth and S.Sudharshan, "Database System Concepts", Tata McGraw-Hill, 6 th Edition, 2010.		